DOCUMENT RESUME

ED 479 634 IR 022 238

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TITLE	Factors Limiting the Proliferation of E-Learning within Small to Medium Sized Enterprises.
PUB DATE	2002-10-00
NOTE	8p.; In: E-Learn 2002 World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education. Proceedings (7th, Montreal, Quebec, Canada, October 15-19, 2002); see IR 022 093.
AVAILABLE FROM	Association for the Advancement of Computing in Education (AACE), P.O. Box 3728, Norfolk, VA 23514. Tel: 757-623-7588; e-mail: info@aace.org; Web site: http://www.aace.org/DL/.
PUB TYPE	Reports - Evaluative (142) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS
DESCRIPTORS	*Computer Assisted Instruction; *Corporate Education; *Distance Education; Nontraditional Education; Organizational Climate; *Organizational Development; Organizational Effectiveness; Organizational Objectives; Postsecondary Education; *Professional Development; Small Businesses

ABSTRACT

In today's cut-throat economic climate, companies have to look more than ever for new ways of operating efficiently. When a company looks for ways of reducing its fixed expenditure it is inevitable that long-term investments, such as the budget allocated for training, will come under scrutiny first. As companies become leaner, and budgets become tighter, the money allocated for training becomes tighter. At the same time there is pressure to maintain a well trained workforce and good ongoing training programs are essential to the recruitment of well qualified staff. As a consequence, trainers and managers of companies are looking increasingly towards employing e-learning to fulfill the need for alternatives to more traditional methods of instruction. However, despite the unprecedented success of e-learning technology within big business, the take-up within small to medium sized enterprises (SMEs) has been somewhat less meteoric. This paper explores the factors inhibiting the utilization of e-learning technology by SMEs, and the innovations the e-learning industry has implemented to overcome them. Particular focus is given to the issues surrounding payment for online learning content. Conclusions include recommendations for future e-learning developments aimed at SMEs. (Contains 17 references.) (Author)

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ED 479 634

Factors Limiting the Proliferation of E-learning within Small to Medium Sized Enterprises

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Abstract: In today's cut-throat economic climate companies have to look more than ever for new ways of operating efficiently. When a company looks for ways of reducing its fixed expenditure it is inevitable that long-term investments, such as the budget allocated for training, will come under scrutiny first. So, as companies become leaner, and budgets become tighter, the money allocated for training becomes tighter. At the same time there is pressure to maintain a well trained workforce and good on-going training programmes are essential to the recruitment of well qualified staff. As a consequence, trainers and managers of companies are looking increasingly towards employing E-learning to fulfill the need for alternatives to more traditional methods of instruction. However, despite the unprecedented success of E-learning technology within big business, the take-up within small to medium sized enterprises (SMEs) has been somewhat less meteoric. This paper explores the factors inhibiting the utilization of E-learning technology by SMEs, and the innovations the E-learning industry has implemented to overcome them. Particular focus is given to the issues surrounding payment for online leaning content. Conclusions include recommendations for future Elearning developments aimed at SMEs.

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Introduction

The World Wide Web has provided methods of supplying tailored, measured and assessable learning material throughout the globe in ways which were unimaginable just a few years ago. The Internet has made distance learning a serious alternative to classroom based training. However, the industry uptake of E-learning technology has been somewhat disappointing – although Elearning technologies have a foothold with key market leaders, notable examples being Cisco, Dell and Microsoft, uptake within the small to medium sized enterprises (SME) sector has been slow.

This paper investigates reasons, both environmental and cultural which may be preventing the smooth integration of Elearning technology, and also aims to investigate the technologies which may increase the lacklustre proliferation of E-learning at the lower end of the financial spectrum, focusing on the integration of modern and innovative e-commerce technologies.

The SME Market

According to the European Commission Information Society Directorate-General an SME is a business which employs less than 250 individuals, and has an annual turnover of less than 40 Million ECU or an annual balance sheet total of 27 Million ECU (European Commission 2002). In the USA the definition is slightly different: 'up to 300 employees, total assets of up to $15 million, and total annual sales of up to $15 million' (IFC 2002).

98% of the 3.7 Million businesses trading in the UK are SMEs (by EU definition) (Small Business Service 2000). In the UK; SMEs account for 51.1% of all turnover and employ 55.1% of all those employed.

In Canada; 6 out of 10 employees work for SMEs (Canadian FIB 2002 - Slide 4). The same statistics also state that 58% of all Canadian SMEs prefer an informal approach to staff training, whereas only 33% have a structured training system (Canadian FIB 2002 - Slide 4). Formalised classroom based training is often beyond the financial reach of smaller businesses, and the only realistic cheaper alternative currently available is

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computer based training (CBT). In the next section, reasons which may account for such a high percentage of SMEs rejecting formalised training are explored.

Factors Inhibiting the Growth of the E-learning Industry in the SME Sector

Legacy Computer/Training Systems

Larger industries have been implementing E-learning solutions for many years, with some significant successes. The focus in many large companies is not the integration of computer based learning CBL into their infrastructure, but rather the amalgamation of many individual, unrelated systems. British Airways have accomplished this, not inconsiderable task with some success. Their 60,000 employees now share a unified training system (Department of Trade and Industry report 2001) which gives all employees access to the same recourses throughout the company. The SME CBL market is not as mature as that of larger businesses, so proper planning of systems as they are integrated should be a consideration to avoid situations such as those prevalent in the E-learning systems of companies such as BA a few years ago.

Utilising modern E-learning software on legacy PCs may pose a major problem for SMEs, in response to this; CD-ROM based CBT is often inherently 'platform specific', that is to say it is designed to run on one specific operating system or type of computer. Many companies now develop content designed to run in any web-browser, on virtually any PC capable of supporting this kind of rudimentary software. As with CD-ROM based applications; there are, however, pitfalls in this approach – in order to deliver interactive learning content incorporating complex multimedia several 'plug-ins' and supplementary applications may be required (for example: Online Expert 2002), for instance 'Flash', 'RealPlayer' and 'Acrobat Reader'. Although implementing these multimedia features expands the range and possible interactivity of learning content, implementing them increases the system requirements of the host computer, and makes use of 'thin clients' such as hand-held computers more difficult. An example of a system, which requires the user to install several components in order to function properly, is the system run by 'Online Expert'. This system also requires an up to date version of 'Microsoft Internet Explorer' browser to be installed, further limiting use of the system by those users who do not use Microsoft technology.

Perceived Ineffectuality

One of the major obstacles to the expansion of E-learning techniques into the SME market is the perceived ineffectuality of the learning material. Technology improvements and innovations in the E-learning sector in recent years have led to dramatic increases of the quality and effectiveness of online learning and computer based training; including levels of interactivity and multimedia content which were impossible just a few years ago. Tests have shown however, that negative preconceptions still exist regarding the effectuality of CBL (Dewhurst Et Al 2000). The same research also indicates that most negative preconceptions about CBL are reversed once effective, modern learning content has been sampled. These prejudices do still exist, and overcoming them is one of the greatest limiting factors on the success of E-learning. The level of interactivity and multimedia content of learning material delivered online has scope for even greater improvement due to the enhancements in streaming technologies, and the increased use of 'broad-band' Internet connections. All these innovations should help to convince sceptical SMEs that there will be an acceptable return on investment provided by E-learning systems.

Large training providers tend to deliver their online learning content through a Learning Management System (LMS). An LMS is a control application that facilitates the administration of learners, and the learning material they have access to; allowing a supervisor to track a student's progress through a course. An effective LMS will usually facilitate the measurement of system performance, providing feedback to a company regarding the usage by staff, and assessment results. An LMS can also ensure that trainees have completed the amount of training and achieved the level of skill required to comply with relevant standards.

Computer Anxiety

Within certain industrial sectors, computer anxiety is still a defining factor in the selection of a training methodology. Anxiety can be predicted and pre-empted within the workplace; certain social groups are more prone to suffering excessive fear or mistrust of computer systems. These groups may be predicted from general demographic information (Mikkelsen Et Al, 2002), and although these problems may be overcome with additional training, many companies may see this as unnecessary expense and be unwilling to embrace computer based learning for this reason alone. (Sun HC 2000) CBL needs a prerequisite of computer proficiency to be attained before it can become effective. To an individual who has, for instance, never had cause to use a mouse; beginning a computer course would be impossible without some human teaching intervention. Several training solutions have been instigated to address this; in Europe, ECDL (European Computer Driving License) courses are available from many training vendors. These low cost courses provide an introduction to computing for users with little or no experience with IT systems (ECDL Tutors (2002).

Perceived High Cost

Perceived high cost is one of the prevailing factors which influence the SME market's continuing rejection of E-learning culture; this is a problem particularly prevalent with learning content which is delivered via the World Wide Web. Online delivery of learning content is fine for 'wired' companies with permanent or 'always on' Internet connections, but for many SMEs the Internet is still a seemingly expensive luxury. This problem recedes with every year that passes, as more and more individuals and businesses are connected to the Internet through free services, or services that use a flat fee system, rather than charging 'per-use'. A greater problem is the lack of Internet access for individual employees within SMEs. In the UK this could pose a substantial obstacle to individual usage of online Elearning systems. Corporate paranoia over security breaches and employee misuse of the internet in the UK have led to this situation, improvements in security systems and staff monitoring are slowly remedying it.

The method of purchasing online training materials may be a contributing factor in the continued failure of the E-learning industry to penetrate SME sector. In general, companies wishing to offer their employees online or computer based learning must either design it in-house, commission bespoke software or purchase an 'off the peg' solution from an existing training provider. Generally the cost is the main inhibiting factor regarding systems designed to meet a specific companies' needs. Generalised 'off the peg' solutions are fine for 'general' training needs, but many companies require training on relatively exclusive systems and skills.

One solution to this particular problem is the modularisation of learning content. Several companies offer training solutions involving a process of selection of several modules from their catalogue, ultimately creating a customised learning experience without the added cost of creating whole courses for a specific company or application. This approach can save money by reducing the overall cost of a customised training solution, but may inspire doubts in customers who may feel that they do not receive a training solution truly designed to meet their needs.

Perceived Lack of Structure and Guidance

In the absence of a formal 'teacher', motivation of learners can become a problem. The environment within which learning takes place is an important factor, as the workplace is not usually a location associated with formalised learning, students may find it hard to concentrate. Without a tutor to structure learning, define deadlines and monitor student progress, motivation may be lost. An LMS can incorporate features which can replicate some of the functions of a tutor and is a highly effective way of deploying modularised E-learning content over the World Wide Web (JJ Kuisma & JA Watson 2002), providing a framework for assessment and tracking of individuals learning in ways that even classroom learning cannot match; it is possible to assess, not only what a student reads, but also how fast and at what time.

An extension of modularisation is 'intelligent tutoring' (JJ Kuisma & JA Watson 2002). Basic modularised training consists of a content designer, be that a tutor or student supervisor, creating a learning path, through a series of modules. These separate modules form the 'lessons' in the online course, a students path through these

modules is often linear and static. There are several obvious problems with this; students may require further tuition on certain concepts within the subject, but not on others. Because the path through the course is pre-set, a student must seek other means to fulfil his or her learning requirements. Intelligent tutoring offers an effective solution to this problem; the learning path is dynamic; once a student has embarked on a module, his/her path through it is not statically defined. This makes several exciting learning concepts possible; if for instance a module is assessed regularly throughout it's course; for instance once every two 'pages' of learning content, a student's answers will alter the path they take through the learning content. For instance, if the student gets questions on a particular concept incorrect, he/she may be directed through an extra module clarifying the subject (A Patel Et Al 2000).

This system may also provide more challenging systems of 'in-course' assessment, if an end of section test is failed and must be re-taken, an intelligent tutoring system could provide an entirely different set of questions (covering the same subject of course) drawn from a central 'pool' of questions on the module. This way, it would not be possible to simply learn the answers to the questions a student answers incorrectly; actual understanding of the subject matter would be necessary to pass the module.

Commitment/Payment

There are several issues regarding the payment method when purchasing online Elearning material, which smaller companies may find daunting. Many E-learning providers require a large initial outlay; customers often have to purchase entire courses or series of courses at once. Some companies offer more SME friendly systems – whereby smaller modules of learning content are purchased (obviously for a smaller price). However, these systems usually require a commitment of a large 'initial set-up' fee or, at best; an account with the training company. This kind of commitment requires great confidence in return on investment, E-learning concepts and the companies providing them. This confidence is often not forthcoming in SMEs.

One method of payment for Elearning content focussing on recognised qualifications is to create a system whereby the 'lessons' are free, but the assessment required to obtain the qualification is chargeable. Thus SMEs may sample the learning content, without any obligation, but once the training is completed may decide to purchase the accredited qualification.

A LMS may also provide a mechanism for 'pay-per-use' charging of learning content. The problems outlined above, regarding the purchase of learning content can be made even more complicated with the introduction of non-linear learning paths (as in intelligent tutoring systems). The LMS can sidestep most of these payment problems relatively easily – the LMS may track all actions a student takes while moving through a course. This information could not only be used for monitoring of an individuals learning, but also their chargeable usage of the system. Some companies are beginning to utilise pay-per-use systems such as these, but the concept is still, largely speaking, in its infancy. In general, companies still require registration of an account to access and use learning content; this is a handicap when dealing with small companies for which this system may represent a daunting commitment.

In order for a pay-per-use system such as the one described above to be truly effective, a commitment free way of transferring relatively small amounts of money would have to be implemented. Unfortunately credit cards are not suitable for this purpose. Since the introduction of 'Diner's Club' (the world's first universal credit card) in 1951, the credit card transaction model has remained largely unchanged. The general model of an online credit-card transaction is very similar. Generally a customer locates the products he/she wishes to purchase and places an order, supplying a credit card number and various personal details for verification. Once the merchant receives the order, it contacts the credit card issuer to verify the customer is authorised to remove the funds. In order to complete a transaction, the following information is supplied by the merchant: Merchant ID, Valid card number, Expiration date, Credit-card limit and Card usage. Either; the transaction is refused, in which case the customer is informed and the sale is cancelled, or the transaction is approved, the funds are transferred electronically to the merchant and the goods are dispatched to the customer (Lamond 1996).

The main flaw with credit card transactions is cost. Mainly thanks to the increase of fraud, online and otherwise, coupled with the administrative tasks required to perform a credit card transaction, the effective 'cost' to a

merchant has increased. The money required recovering stolen or misplaced funds, and the lost funds themselves contribute to this overhead. This situation effectively means that it is only economically practical to make credit cards transactions above a certain monetary amount. In the offline world this is not a major problem. Smaller purchases (of a few pounds or a matter of pence), i.e. a bus ticket or a newspaper, can easily be purchased with cash. However, because of the overhead on credit and debit cards it is currently impractical to purchase items such as these remotely through the Internet or over the phone.

Generally, e-commerce websites are centred on the sale of items and services of a value of at least £10.00 (GBP). Although websites do sell items below this price, they usually do so alongside more expensive products, rarely does a seller specialise in extremely small goods. The monopolisation of the online shopping community by credit card based payment systems has proved to be the stumbling block to the sale of small scale intellectual property e.g. online newspapers, sports scores or in this case; Blearning material. To attempt to facilitate the purchase of low value items, several systems have been devised. Unfortunately, mainly due to poor industry collaboration and low retailer uptake, the systems have not been adopted widely by consumers and consequently many have failed.

Many recent notable systems have relied on a subscription based approach to the purchase of goods. A user purchases 'electronic cash' via credit card, in a large enough denomination to make a credit card purchase financially viable e.g. £15.00, then uses this electronic cash in much smaller units to make purchases at participating vendors. The accepted terminology for such small purchases is Micropayment (M Liskov 2001). In principal this model is a viable method of making Micropayments remotely or online. A similar system to the one described above was implemented by Digicash. The system was developed by the renowned Dr. David Chaum and, in its infancy, was billed as the future of electronic payment systems. Unfortunately Digicash filed for bankruptcy in 1998, and in early 1999 was acquired by eCash Solutions, who discontinued the project (McCullagh 2002). One flaw of this product, which may discourage a merchant from taking it up, is the requirement of subscription and initial deposit. This removes the possibility of 'impulse buying' for non-subscribed users. Also, consumers may be unwilling to deposit relatively large amounts of cash with a company who may only have one or two merchant partners. Effectively a customer could be left with an 'e-wallet' full of 'e-cash' and nowhere to spend it.

This unwillingness to support new and un-established services by both consumers, and the retail industry as a whole has brought about the birth of many innovative methods of utilising existing Micropayment systems. For example, telephone users are effectively already equipped with a fully functional Micropayment system: Calls costing a small amount are paid for as part of larger bill, at a regular interval. The Orange network has already implemented a mobile telephone based Micropayment system in Denmark, with promising results. This could be extended to an Blearning system, for instance by utilising the chargeable Short Message Service (SMS) (used to purchase mobile telephone 'ringtones' and graphics by hundreds of vendors in the UK alone) to pay for learning content as and when it is required.

Purely online payment systems have also attracted the attention of some major IT companies in the last couple of years: most notably Millicent. This is a Micropayment system implemented by Digital Equipment Corp, now owned by Compaq. The system went live in June 1999 in Japan, with wallets starting at 1000 yen and payments as small as 5 yen (approximately £0.025 at launch time). The system was also given a trial in the USA. Compaq claim MilliCent's trial run went "extremely well." The trial had 10,000 users buying small pieces of content from more than 45 vendors, including the Oxford University Press, which sold dictionary lookups; and the University of California at Berkeley, which sold individual book chapters (Mitchell 1998). About 84 percent of the transactions were for less than 25 cents, and 73 percent were for less than 5 cents. The median transaction was for 2 cents, but, thanks to a few people who spent a few dollars at a time, the mean average was 30 cents (Mitchell 1998). Despite these early promising reports, development of the system is currently suspended indefinitely (Compaq 2002). Compaq spokesmen claim that this is due to the company's focused nature, and a desire to remain largely in the business of the supply of hi-tech hardware. Compaq are planning to license the software to a third party to complete the development (Mitchell 1998).

Conclusions

Uptake of Elearning by SMEs has been slow and this is mainly due to the cost efficiency of an E-learning solution being tied to economies of scale. SMEs have fewer staff and less money to spend on training than larger companies and often find paying for the development of a bespoke E-learning solution too expensive to swallow. The E-learning industry is responding to this by developing generic products aimed at specific SME markets. However, these products are still perceived as expensive at the point of sale. In addition, the generic content of such material does not always match a SME that may have more specific requirements. One solution to this problem may be to examine pay-per-view as a payment option that would make the pill of training expenditure a little easier to swallow.

Commitment free pay-per-view online payment for E-learning content is still in its infancy. Until a form of E Cash is devised which is globally accepted and achieves a reasonable level of consumer uptake – the truly 'no strings attached' approach to Elearning payment may not be viable. When a suitable system is finally developed, E-learning will become a much more financially viable option for SMEs and the general public, revolutionising the industry in the same way that 'pay-as-you-go' technology did for the mobile telephone industry in the UK. For now, account based 'pay-per-use' LMS based systems may yet provide a convenient and useable interim solution.

In addition to overcoming the financial hurdle of implementing an Elearning solution companies, SMEs especially, need to measure their return on investment. Many of the quality issues to do with E-learning may be overcome with the deployment of an advanced LMS. Several companies already offer Learning Management Systems, of varying levels of depth and effectiveness, and as these systems become more prevalent and standardised they could hold the key to the SME friendly E-learning systems of the future. The measuring and monitoring features incorporated within LMS' should also help to inspire confidence with respect to motivation of learners.

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